



# *World Water Monitoring Day*

# 10



## *Year in Review*

A large, stylized number '10' is positioned on the left side of the page. The '1' is light blue and the '0' is orange, both with a slight shadow effect.

## World Water Monitoring Day™

World Water Monitoring Day (WWMD™) is an international education and outreach program that builds public awareness and involvement in protecting water resources around the world by engaging citizens to conduct basic monitoring of their local waterbodies.

An easy-to-use test kit enables everyone from children to adults to sample waterways for a core set of water quality parameters including temperature, acidity (pH), clarity (turbidity), and dissolved oxygen. Results are shared with participating communities around the globe through the WWMD Web site.

The Water Environment Federation® (WEF®) and the International Water Association (IWA) coordinate WWMD and officially observe it on Sept. 18. While this day marks the official date, the window for monitoring begins each year on March 22 and runs until Dec. 31. Thus, participants are able to choose *their* WWMD.

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# Executive Summary

While officially observed on Sept. 18, World Water Monitoring Day activities took place from March through December in 2010. Dec. 31 served as the deadline for reporting data to the WWMD database for inclusion in this report.

WWMD participants sampled their local lakes, streams, rivers, ponds, estuaries, and other waterbodies for four key water quality indicators: dissolved oxygen, pH, temperature, and turbidity. Some groups also monitored for the presence of macroinvertebrates such as dragonflies, mayflies, and scuds. Samples were taken in a range of settings — agricultural, commercial, residential, and industrial — on six continents.

A total of 212,502 participants monitored sites worldwide, which represents a more than 73% increase over 2009. For the second year, Malaysia took top honors for the number of program participants with over 86,000 involved in water quality monitoring activities.<sup>1</sup>

Groups and individuals from 85 countries reported WWMD data in 2010 — four more than the 81 logged in 2009. U.S. participants reported data from the largest number of sites (2,931). After the United States, Spain (1,485), Romania (301), and Malaysia (290) led global WWMD efforts in the number of sites monitored.

In 2010, 16,564 WWMD test kits were distributed — 51 more than were distributed in 2009.

The coordinators of WWMD, the Water Environment Federation (WEF) and the International Water Association (IWA), received financial and in-kind support in 2010 from primary sponsors: the U.S. Geological Survey, the U.S. Environmental Protection Agency, PerkinElmer, ITT Corporation, Sinclair Knight Merz (SKM), and Smithfield Foods.

<sup>1</sup> The coordinators of WWMD recognize that a number of participants have committed to ongoing monitoring of their local waterways and have tested at more than one site and/or more than one time. The number of participants reflects the number of unique visits to a site for the purpose of water monitoring.





# 10 Highlights



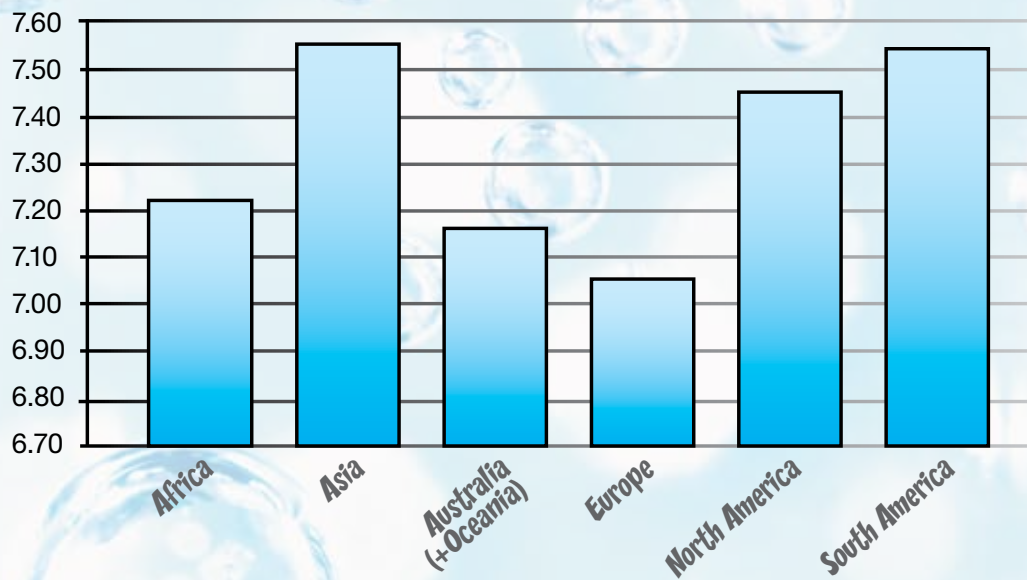
## World's Water at a Glance

The following figures represent the results of World Water Monitoring Day 2010 for the continents of North America, South America, Europe, Asia, Africa, and Australia (including Oceania) based upon the four WWMD water quality parameters. Please bear in mind that the results reported for WWMD do *not* constitute a completely thorough and accurate portrayal of the health of the world's water. More detailed information on these results is available in the appendices of this report.<sup>1</sup>

Continent	Sites in Sample	DO (PPM)	pH	Temperature (°C)	Turbidity (JTU)
Africa	164	4.63	7.22	23.91	26.94
Asia	1,168	3.31	7.55	24.50	26.96
Australia/Oceania	60	5.92	7.17	19.76	20.05
Europe	1,908	5.12	7.05	13.35	19.35
North America	2,965	7.16	7.46	18.53	15.79
South America	44	6.69	7.54	15.32	21.72

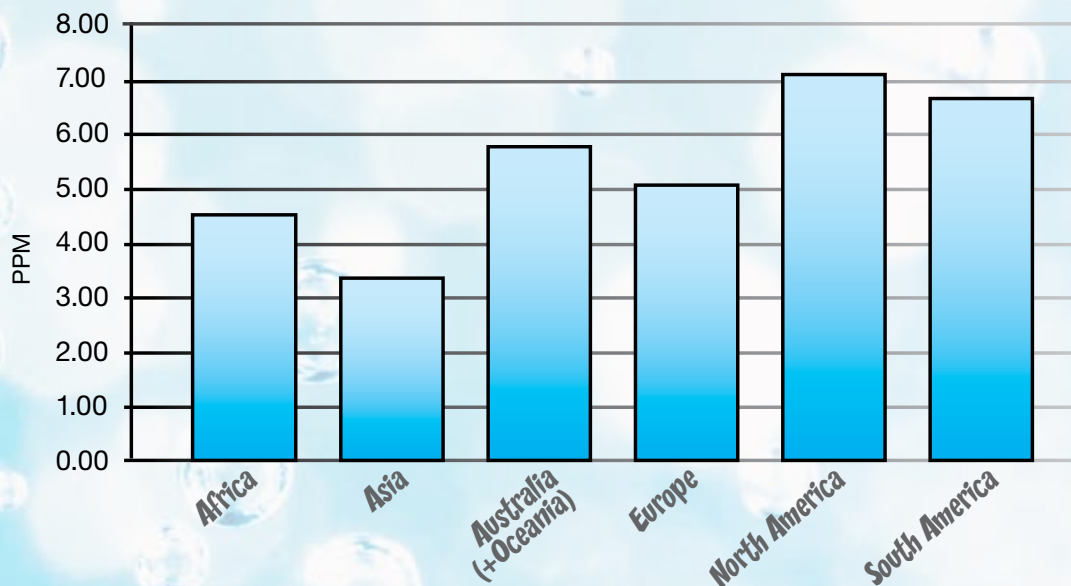
<sup>1</sup> Credible water quality sampling requires the use of standard quality assurance protocols and is conducted by trained volunteer monitoring groups and professionals around the world.

## Average pH



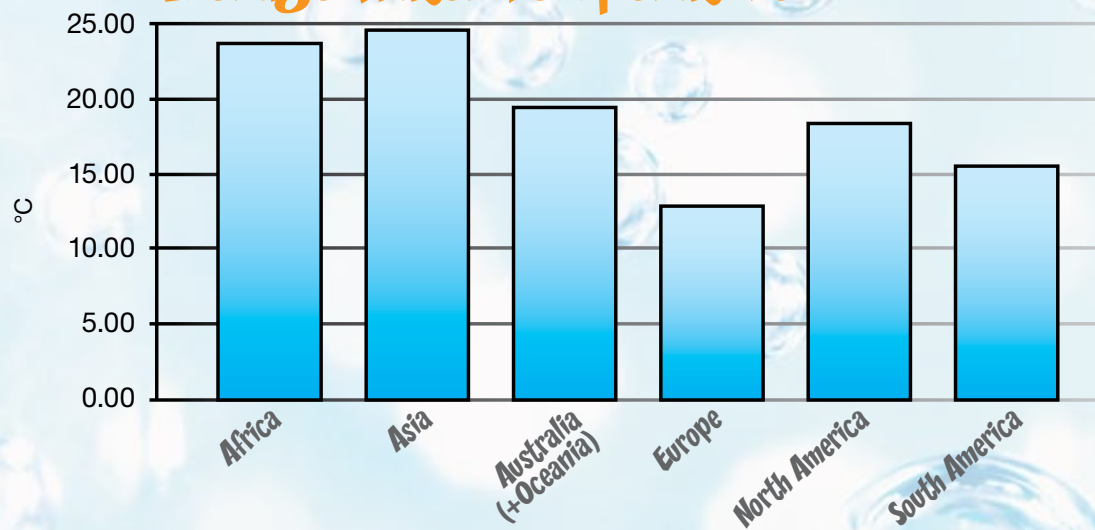
# World's Water at a Glance

## Average DO

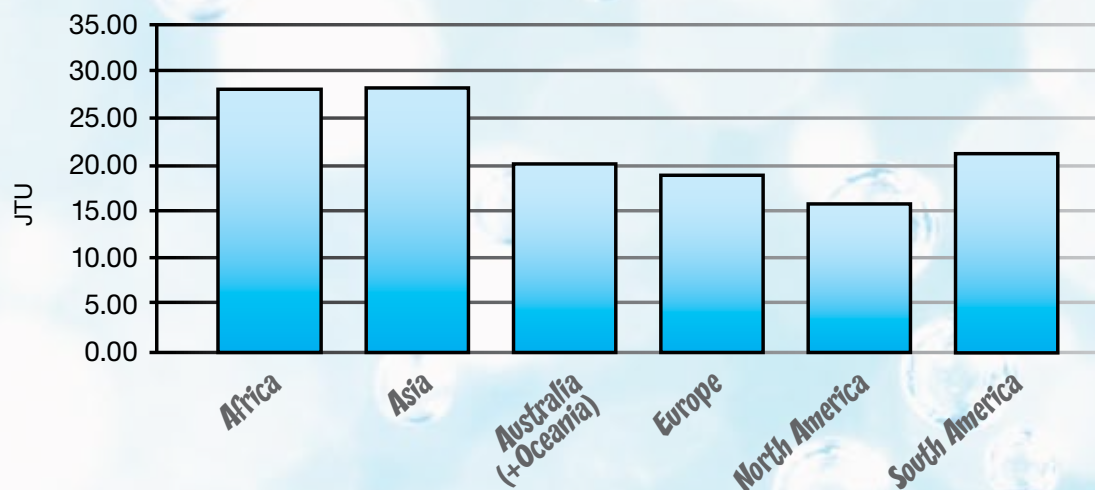




## Average Water Temperature



## Average Turbidity





## On Location

### Hong Kong, China

Submitted by Irene Chu  
Water Supplies Department

For the seventh consecutive year, the Water Supplies Department (WSD) organized a World Water Monitoring Day celebration in Hong Kong.

The WWMD program aligns with the organization's mission of educating the public about valuing water and using it wisely. The celebration, held in conjunction with the launch of a water conservation design competition, took place on Sept. 18. One hundred students from Semple Memorial Secondary School were invited to the Tai Lam Chung Reservoir to test its water quality.

To start the program, two chemists from WSD demonstrated the testing procedures. Students were then divided into small groups. Each group conducted three sampling tests using a standard test kit. With the guidance of teachers and chemists, the test results (including temperature, pH, turbidity, and dissolved oxygen) were successfully submitted to the chemists for consolidation and analysis.

The reservoir measured a healthy 8 ppm for dissolved oxygen and a pH of 7. Turbidity measured 0 JTU. The water temperature was 34°C. In conclusion, the quality of this raw water source appeared to be free of serious pollution.



### First 'Water Champions' Announced

On March 22, 2010, the World Water Monitoring Day program announced the winners of the first annual Water Champion Award competition. Awardees were honored for their outstanding achievement in boosting awareness of water quality issues via WWMD in calendar year 2009.



Winners of the 2009 Water Champion Award included:

- Apa Canal 2000 (Group, Europe)
- Community Centred Conservation (Group, Africa)
- Escuela de Enseñanza Media N° 3007 "FIGHIERA" (Group, South America)
- Jewish National Fund (Group, North America)
- Mengyi, Neakoh (Individual, Africa)
- National Environmental Education and Research Foundation (Group, Asia)
- Stepanavan Youth Center (Group, Europe)
- Supramaniam, Kalaimani (Individual, Asia)
- Tabacsko, Meg (Individual, North America)
- Toledo, Veronica (Individual, South America)
- Wollondilly Anglican College (Group, Australia/Oceania)

Two 2010 Water Champion awards will be awarded on March 22, 2011 (World Water Day) in each of six regions: Africa, Asia, Australia/Oceania, Europe, North America, and South America.

WWMD would like to extend its gratitude to the water industry professionals who have volunteered to serve on their region's judging panel. To see a list of the individuals serving on the 2010 Water Champion judging panels, see the appendices of this report.

### WWMD, UN Celebrate World Water Day in Nairobi

People around the globe observe the United Nations World Water Day (WWD) each year in an effort to draw attention to the ongoing and critically important issue of access to clean water. This year, World Water Monitoring Day took part in the UN-dedicated WWD 2010, which featured the theme "Clean Water for a Healthy World."

During the 3-day flagship event in Nairobi, Kenya, policy-makers, scientists, and eminent personalities discussed how to address the challenges of degrading water quality around the world. On March 21, three site visits in Kenya were organized to understand the critical importance of water quality for ecosystem functioning, human well-being, and livelihoods. WWMD activities were conducted at each of these sites, with 20 children taking water quality samples from Lake Victoria, Mombasa, and the Nairobi River. By testing the water quality for four basic parameters (pH, turbidity, dissolved oxygen, and temperature), children at each site learned more about water quality and how prevention of fresh water pollution is important for all-around health.

### WEF, IWA Celebrate WWMD 2010 in Washington, D.C.

The Water Environment Federation (WEF) and the International Water Association (IWA) hosted 100 guests and nearly 300 schoolchildren at the Washington, D.C., celebration of World Water Monitoring Day on Thursday, Sept. 16 at Hains Point in East Potomac Park.



Emceed by NBC News4 Meteorologist Veronica Johnson, the program featured remarks from Congresswoman Donna F. Edwards (D-Md.) and inspirational words from 2009 North America Water Champion Award winner Jewish National Fund, which were delivered by Director of Education Programs and Resource Development Michelle Wachtel. Also speaking were WEF President Paul Freedman, IWA North America Director Kristina Kohler, and DC Water Director of Public Affairs Alan Heymann.

As the formal program came to a close, students from Imagine Hope Community Charter School (Washington, D.C.), Immanuel Lutheran School (Alexandria, Va.), J.C. Parks Elementary School (Indian Head, Md.), Jefferson-Houston School for Arts and Academics (Alexandria, Va.), Jewish Primary Day School of the Nation's Capitol (Washington, D.C.), and St. Michael the Archangel School (Silver Spring, Md.) performed tests on the Potomac River and visited a variety of educational and interactive displays on a number of water quality topics.

Participating organizations included: Alexandria Office of Environmental Quality, Alice Ferguson Foundation, Anacostia Riverkeeper, Audubon Naturalist Society, DC Water, District Department of the Environment, Interstate Commission on the Potomac River Basin, Jewish National Fund, LaMotte Company, National Aquarium, National Environmental Education Foundation, National Oceanic and Atmospheric Administration, National Park Service, SCUBA nauts International, U.S. Coast Guard Sea Partners, U.S. Environmental Protection Agency, U.S. Forest Service, U.S. Geological Survey, Virginia Department of Environmental Quality, Virginia Water Environment Association, and the Washington Suburban Sanitary Commission.

## WWMD's Michelle Tuesday Visits Australia in New Book

Taking a cue from the popularity of 2008's World Water Monitoring Day children's book, *A Waterproof Case*, program coordinators collaborated once again with writer/illustrator team Deborah Rodney and Jessica Bonin to produce a sequel in 2010. The new book, *The Water Down Under*, follows Detective Michelle Tuesday on a vacation to Australia where she is immediately put to work by the denizens of a local freshwater community. In addition to highlighting physical and chemical testing, *The Water Down Under* stresses the importance of using one's skills of observation to assess water quality.

Appropriate for children of ages 8–11, hard copies of the storybook are available free of charge in both English and Spanish upon request.

## New Map Promotes Sharing of Data, Experiences

In September, World Water Monitoring Day enthusiastically announced the launch of a new mapping feature for the program's Web site. Developed as a volunteer effort by the New Zealand-based firm Outpost Central, the new map communicates with the WWMD database in real time in order to plot all data collection sites. In addition to visually displaying monitoring data, the map's features enable users to add photos and comments to their sites, as well as easily click and compare their results to those of others from countries around the world.







# FO Participation

data sheet Jill, Annette, Annie

Parameter Site 1 Site 2 Site 3 Site 4 Site 5

Date 22/3

Location Pond

Air Temp 8°C

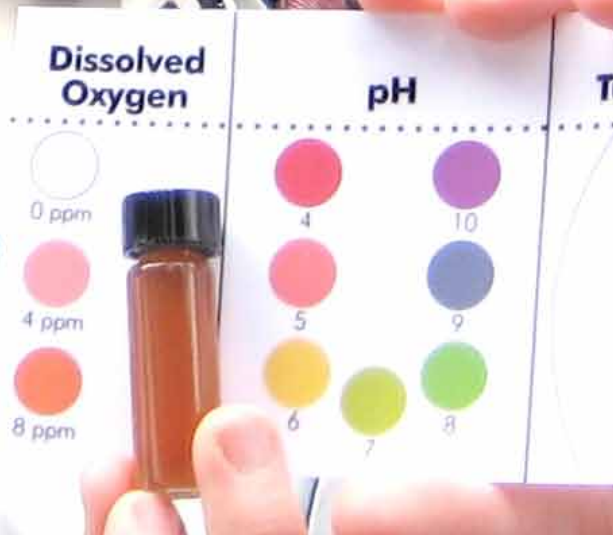
Turbidity 0.1 TU

Water Temp 1°C

DO 1.0

pH 8.0

Merits: 100% + 100% + 100%



## WWMD data was reported by participants in the following countries:

Albania	Brunei	Cuba	Honduras	Lithuania	Papua New	Singapore	Timor-Leste
Argentina	Darussalam	Czech Republic	Hungary	Macedonia	Guinea	Slovakia	Togo
Armenia	Bulgaria	Dominica	India	Malaysia	Paraguay	Slovenia	Turkey
Aruba	Cameroon	Ecuador	Indonesia	Mali	Philippines	South Africa	Uganda
Australia	Canada	Estonia	Iran	Mexico	Poland	Spain	United Kingdom
Austria	Chile	Finland	Israel	Morocco	Portugal	Sri Lanka	United States
Bangladesh	China	Georgia	Italy	Nepal	Romania	Sudan	Uruguay
Belarus	Colombia	Germany	Jamaica	Netherlands	Russian	Sweden	Vanuatu
Belgium	Congo	Ghana	Japan	Niger	Federation	Taiwan	Vietnam
Bolivia	Costa Rica	Greece	Kazakhstan	Norway	Saint Lucia	Tajikistan	Zambia
Brazil	Croatia	Guatemala	Kenya	Pakistan	Sierra Leone	Thailand	Zimbabwe

# Numerical Summary

Eighty-five countries participated in World Water Monitoring Day 2010, and 212,502 participants reported data from a total of 6,325 sites.<sup>1</sup>

## Sites Monitored<sup>2</sup>

<b>6,325</b>	<b>Total Sites Monitored</b>
3,394	Outside the U.S.
2,931	United States

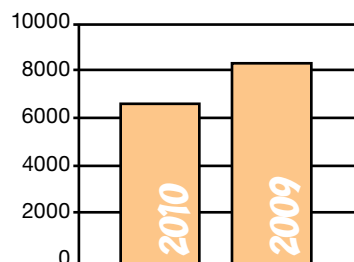
## Participants

<b>212,502</b>	<b>Total Participants</b>
171,103	Outside the U.S.
41,399	United States

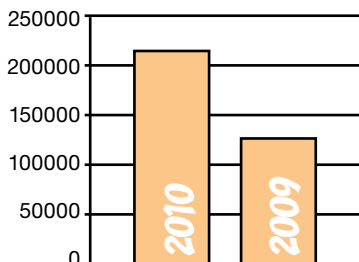
## Test Kits Distributed

<b>16,564</b>	<b>Total Kits</b>
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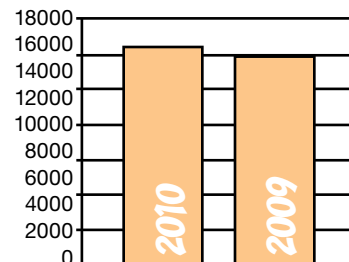
## Sites Monitored



## Participants



## Test Kits Distributed



<sup>1</sup> The coordinators of WWMD recognize that a number of participants have committed to ongoing monitoring of their local waterways and have tested at more than one site and/or more than one time. The number of participants reflects the number of unique visits to a site for the purpose of water monitoring.

<sup>2</sup> While the number of sites monitored in 2010 was down from 2009, coordinators have noticed that more participants are monitoring a single site as part of a larger WWMD event.



## On Location

### Imlay City, Michigan, USA

Submitted by Juliann Emmerling  
Imlay City Middle School

Sixth graders from Imlay City Middle School participated in World Water Monitoring Day in April by testing the water quality of the Belle River in Imlay City.

The students and teachers hope that participating in WWMD will achieve their goal of encouraging the state to recognize and protect their local watershed. The class chose their particular testing day for its significance as the anniversary of a city decision not to mow close to the banks or dredge the river.

The students used the WWMD kits to examine the temperature, turbidity, dissolved oxygen, and pH levels of the river's water in order to help determine its quality. In addition to using the test kits, the students observed the biodiversity and invasive species along the river to further develop their assessment.

The students thank WWMD for the fun, easy-to-use test kits that helped them learn more about their watershed!

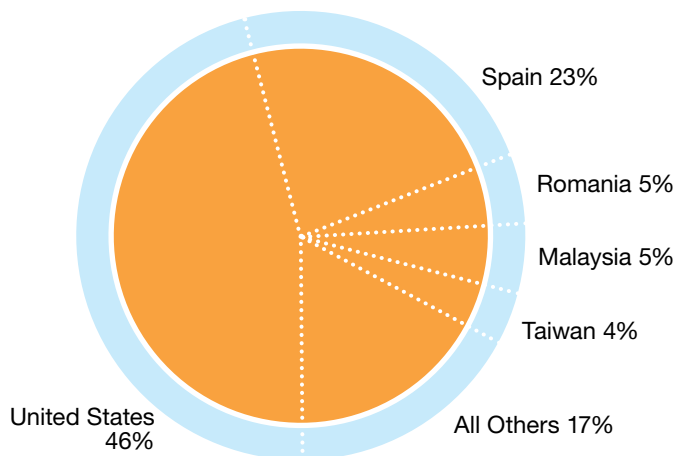


## Worldwide Leaders in World Water Monitoring Day 2010

The coordinators of WWMD appreciate the contributions of each and every person who took part in the program this year. A full account of each country's participation is located in the appendices of this report. WEF and IWA would, however, like to acknowledge numerical leaders in participation both globally and within the United States.

### Number of Sites Monitored

United States	2,931
Spain	1,485
Romania	301
Malaysia	290
Taiwan	255
All Others	1,063
<b>Total</b>	<b>6,325</b>







## On Location

### Helsinki, Finland

Submitted by Paula Kämäri  
HSY Helsinki Region Environmental  
Services Authority

“First the water was yellow, but now it’s turquoise!” whoops an eager 10-year-old student. He has successfully measured his water sample’s pH and found that the water of the nearby Vantaa River is neutral. All of the fifth-grade students got approximately the same measurement — varying from 7 to 8.5.

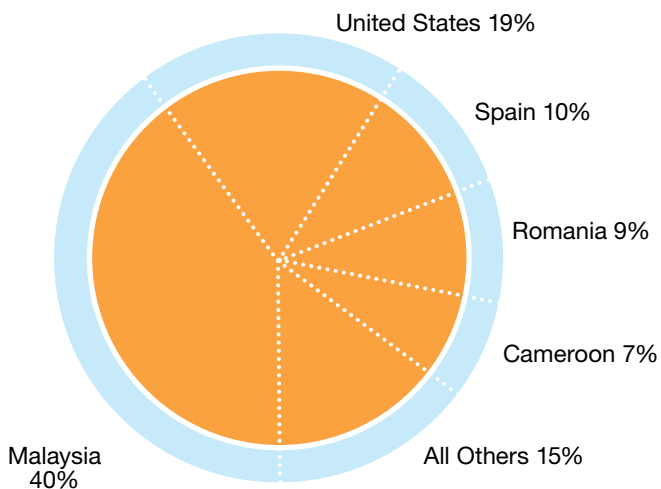
A cooperation project for 11- to 13-year-old schoolchildren called “Water Route” started in Helsinki, Finland, in mid-September. The idea of the Water Route is to invite school classes to explore water from different angles at three separate locations: the Heureka Science Centre, the Museum of Technology, and the Viikinmäki water treatment plant.

Along the Water Route, children analyze plankton, go back in time before the water pipes were invented, make fishing equipment of their own, and examine water samples taken from the Vantaa River. The first pilot groups saw at least copepods and daphnias through their microscopes. They also analyzed the color and the opacity of the water.

There were 21 children who took part in the first excursion of the Water Route. By the end of 2010, another five classes will have completed the same adventure.

### Number of Participants

Malaysia	86,242
United States	41,399
Spain	20,362
Romania	18,147
Cameroon	14,599
All Others	31,753
<b>Total</b>	<b>212,502</b>





## On Location

### Yambol, Bulgaria

Submitted by Vanessa Lee Raymond  
U.S. Peace Corps

In March, middle and high school students from three schools in Yambol participated in water monitoring activities as part of a local initiative titled Students for a Cleaner Tundja River.

Organized by the community foundation Bridges Over Tundja, the monitoring activities were conducted by the students at three different locations with the assistance of their homeroom and biology teachers. The groups tested the river's temperature, turbidity, pH, and dissolved oxygen levels with two test kits donated by the World Water Monitoring Day program.

The Tundja River is an integral part of Yambol's landscape, surrounding the city on three sides. One of the monitoring sessions, which took place on World Water Day (March 22), drew attention from local fishermen who looked on with amusement. When asked about the results following the testing, the students replied "terrible." One girl laughed and added, "No, really, it's not that bad."

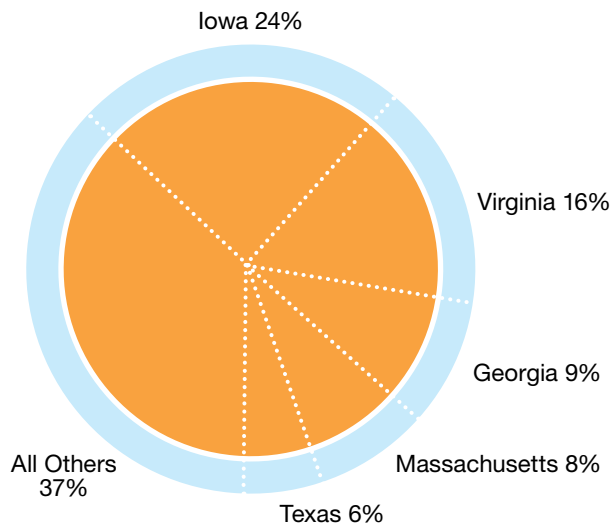


## United States Leaders in World Water Monitoring Day 2010

The following states are commended for their leadership in WWMD participation in 2010.

### Number of Sites Monitored

Iowa	692
Virginia	483
Georgia	272
Massachusetts	240
Texas	166
All Others	1,078
<b>Total</b>	<b>2,931</b>





## On Location

### Franschhoek, South Africa

Submitted by Bernelle Verster  
Water Institute of Southern Africa,  
YWP Program

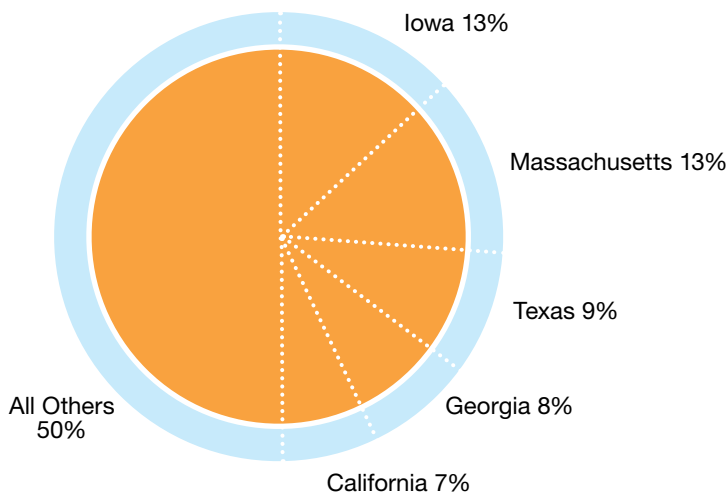
On Oct. 8, students from several universities in South Africa had the opportunity to participate in a trial run of the Water Institute of Southern Africa's WaterBus water monitoring campaign.

The university students engaged younger students from the Bridgehouse School and Simondium Primary in monitoring the Franschhoek River and Bergriver Dam. In addition to the four indicators for which the World Water Monitoring Day kit tests, the students learned how to use electric current to measure the water level. Following their monitoring experience, the students were able to visit the Wemmershoek wastewater treatment plant where they learned about the difference between industrial wastewater and domestic wastewater.

The successful day was very encouraging, and the WaterBus program hopes to use its experiences to develop a nationwide water awareness and education campaign for schools in 2011.

### Number of Participants

Iowa	5,392
Massachusetts	5,224
Texas	3,620
Georgia	3,421
California	2,935
All Others	20,807
<b>Total</b>	<b>41,399</b>





# F10 *Coordinators, Sponsors, and Partners*



The program's committed sponsors and partners, along with countless other local schools, civic organizations, volunteer monitoring groups, and interested individuals, have worked tirelessly in support of its mission. These organizations are serious in their desire to present opportunities for educating people around the world about water quality issues and stewardship. The diversity of this group demonstrates the important role water plays in every sector of our society.

## 2010 Coordinators



### Water Environment Federation

Formed in 1928, the Water Environment Federation (WEF) is a not-for-profit technical and educational organization with 36,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. WEF and its Member Associations proudly work to achieve their mission of preserving and enhancing the global water environment®.

WEF's mission is the basis for all of its programs and activities. WEF is governed by a member-appointed board of trustees acting on behalf of its membership to advance its goals of providing information, education, and resources to water quality professionals and the public. Visit WEF online at [www.wef.org](http://www.wef.org).



International  
Water Association

### International Water Association

The International Water Association (IWA) is the global reference point and network for water professionals, spanning research and practice and covering all facets of the water cycle. Through its network of members and experts in research, practice, regulation, industry, consulting, and manufacturing, IWA is in a better position than any other organization to lead and support water professionals to create innovative, pragmatic, and sustainable solutions for current and future global water challenges.

IWA has approximately 10,000 individual and 400 corporate members in 130 countries. The strength of IWA lies in the professional and geographical diversity of its members. This global mosaic of national, corporate, and individual member communities allows multilevel collaboration, generating knowledge and expertise exchange on all aspects of the science, research, practice, and management of water. Visit IWA online at [www.iwahq.org](http://www.iwahq.org).





## On Location

### Melbourne, Australia

Submitted by Wendy Smith

Sinclair Knight Merz

Standing at the edge of a small stream in eastern Melbourne, students from Antonio Park Primary School were asked a simple question — what can you see, and what can you hear? The answers came back — cars, houses, birds, trees, rubbish, water, grass.

Over 3 weeks, 100 students between the ages of 8 and 10 measured the water quality of the Mullum Mullum Creek. In small groups of five, several indicators were measured, discussed, and recorded. The students were challenged to understand how water quality might change following rain or during dry periods. The groups searched for signs of aquatic life and water pollution, and they talked about how their lifestyles might impact water quality.

The Mullum Mullum Creek receives runoff from residential developments, natural bushland, and a major road network. It is the foundation of a significant urban wildlife corridor, which ultimately feeds into the Yarra River. The heritage of the creek corridor was recognized and protected via a significant decision by the State Government of Victoria to route the nearby Eastlink motorway through a tunnel, thereby minimizing its environmental impact.



## 2010 Sponsors

The following sponsors made WWMD 2010 possible through their generous financial support and participation:



### U.S. Geological Survey

The U.S. Geological Survey (USGS) has the principal responsibility within the federal government to provide the hydrologic information and understanding needed by others to achieve the best use and management of the nation's water resources. To accomplish this mission, the Water Resources Division, in cooperation with state, local, and other federal agencies, systematically collects and analyzes data to evaluate the quantity, quality, and use of the nation's water resources. It provides results of these investigations to the public. USGS also conducts water-resources appraisals describing the occurrence and availability, as well as physical, chemical, and biological characteristics of surface and groundwater.

In support of WWMD 2010, USGS Water Science Centers hosted conferences, hands-on demonstrations, and other fun-filled activities for a multitude of students, citizens, and public officials across the nation. USGS hydrologists and technicians performed stream gage and real-time data demonstrations, water-quality sampling, and fish and invertebrate collections. Presentations and discussions focused on an understanding of streams requiring monitoring for stream flow, chemistry, and aquatic life. Visit USGS online at <http://water.usgs.gov>.



### U.S. Environmental Protection Agency

The mission of the U.S. Environmental Protection Agency (EPA) is to protect human health and to safeguard the natural environment — air, water, and land — upon which life depends. EPA provides leadership in the nation's environmental science, research, education, and assessment efforts by working closely with other federal agencies, state and local governments, and Native American tribes. EPA's Office of Water works to ensure safe drinking water; protect and restore oceans, watersheds, and other aquatic ecosystems; and provide healthy habitats for fish and wildlife, plants, and people.

EPA was again a primary partner of World Water Monitoring Day in 2010. EPA employees assisted with hands-on learning activities at the official WWMD celebration at Hains Point in Washington, D.C., on the banks of the Potomac and Anacostia rivers. In addition, on Sept. 22, scientists from EPA's Region 8 office partnered with CH2M HILL and the Colorado Department of Public Health and Environment to host 100 fifth-grade and middle school students at a WWMD event at Confluence Park on the South Platte River in Denver. Students conducted chemical sampling with WWMD kits and learned about the role of benthic macroinvertebrates as indicators of water quality. EPA Region 8 also partners with the Peace Corps to support WWMD activities in Macedonia and Costa Rica. For more information on EPA's Office of Water, visit [www.epa.gov/ow](http://www.epa.gov/ow).





## PerkinElmer

PerkinElmer takes action to improve the health and safety of people and their environment. Engaged in a proactive fight against illness, contamination, and threats to our well-being, PerkinElmer conceives and delivers scientific solutions, components, and services to meet society's ever-changing needs.

PerkinElmer also plays an active role in the stewardship of the planet's important resources. Dedicated to improving and protecting the global water supply, its water quality solutions detect harmful substances, including trace metal, organic, pesticide, chemical, and radioactive contaminants.

Through EcoAnalytix™, only PerkinElmer brings together four ways to improve environmental health worldwide: innovative technologies in environmental monitoring and renewable energy development; environmental stewardship in product and process development to reduce the impact on our natural resources; critical scientific knowledge; and an active voice for change.

PerkinElmer is working with and through customers, local governments and NGOs, such as the Water Environment Federation and the International Water Association, to generate awareness of global health and well-being to people across the world. As part of World Water Monitoring Day, PerkinElmer is working with schools in Europe, Asia, and the Americas to implement local water testing programs. Visit PerkinElmer online at [www.perkinelmer.com](http://www.perkinelmer.com).



## ITT watermark

*Because every drop counts*

## ITT Corporation

ITT Corporation is a vibrant part of the global economy. As a high-technology engineering and manufacturing company, ITT employs approximately 40,000 employees and operates in 140 countries. As a global water leader, the company's products touch every part of the water cycle — delivering fresh water to communities and commercial businesses, treating and disinfecting it, transporting the wastewater, and returning it to our streams and rivers cleaner than it came in.

In keeping with its clean water goals, ITT is — through its corporate citizenship program ITT Watermark — a committed sponsor of World Water Monitoring Day, as well as the global sponsor of the Stockholm Junior Water Prize competition. Visit ITT Watermark online at [www.ittwatermark.com](http://www.ittwatermark.com).



## On Location

### Hanoi, Vietnam

Submitted by Tong Thi Hoang Duong and  
Nguyen Ngoc Mai  
Hanoi University of Technology

On Sept. 19, 300 volunteers from four environmental youth clubs (Go Green, 3R, and clubs from Hanoi Natural Resources and Environmental College and Hanoi National University of Education) participated in a large World Water Monitoring Day event in Hanoi. During the two weeks leading up to WWMD, these clubs heavily promoted the program on their Web sites, Web forums, and Facebook pages. The event marked the first time that the clubs had collaborated on an environmental event for the community.

Splitting into four groups, the 300 volunteers monitored the water quality of four important lakes in Hanoi: West Lake, Thanh Cong Lake, Ngoc Khanh Lake, and Giang Vo Lake. With the opportunity to perform the basic WWMD tests on their own, the volunteers were all proud to identify themselves as environmentalists.

The volunteers also recognized their responsibility to call upon local youth to participate. By making WWMD a community event, the groups could better educate citizens about the importance of protecting their water resources. Club members look forward to contributing to a larger WWMD event in 2011.





## On Location

### Aysen Region, Chile

Submitted by Veronica Toledo  
COPAS Center & AquaSendas

The first rays of sun and a chilly breeze marked the beginning of our journey to the National Monument Dos Lagunas, located 20 kilometers east of Coyhaique in the Aysen Region of Patagonia.

Snowy mountain sceneries, green meadows, and tanned pastures welcomed us as we trekked into this vast natural territory. Eventually, we found Laguna Escondida surrounded by fences. We managed to enter and get close to one edge. Manuela Pérez, marine biologist, and Luis Pinto, oceanographer, took two samples with the World Water Monitoring Day kit yielding an interesting result. The strip thermometer marked zero, and using a digital thermometer, we measured a below zero temperature of  $-0.4^{\circ}\text{C}$ . For the first time, we were measuring semi-frozen water! In fact, we could see solid pieces of ice on the surface of the lake giving rise to liquid water when a stone was thrown. Departing at dusk, we stopped alongside the road to record the physico-chemical characteristics of a waterfall.

This expedition took place in June (winter in the southern hemisphere) allowing us to delve a little deeper into the mysteries of the water cycle as we traveled in the Chilean Patagonia.



### Sinclair Knight Merz (SKM)

SKM is a leading projects firm with global capability in strategic consulting, design, and delivery. It operates in three regions: Asia Pacific, the Americas, and EMEA (Europe, Middle East, and Africa), deploying some 6500 people from more than 40 offices while serving the buildings and infrastructure, mining and metals, power and energy, and water and environment sectors. Formed in 1964 as a private company, SKM has retained its independence through employee ownership with fee income now greater than AU\$1 billion per annum.

SKM became a sponsor of World Water Monitoring Day in mid-2009 and quickly moved to communicate the merits of the program to clients, community groups, and staff, particularly in the Asia Pacific region where it is headquartered.

SKM's General Manager, Water & Environment, Mark Clarke said that linking up with WWMD was a very easy decision. "We recognize the need for careful resource management, restoration of natural ecosystems, and the maintenance of productive uses as they underpin our economy and quality of life. As a result, our connection with WWMD is a very natural fit," he said. Visit SKM online at [www.skmconsulting.com](http://www.skmconsulting.com).



### Smithfield Foods

With annual revenues approaching US\$12 billion, Smithfield Foods is the world's largest pork processor and hog producer, as well as a production leader in many packaged meat categories. Its mission is to be a trusted, respected, and ethical food industry leader that excels at bringing nutritious meat and specialty food products to millions every day while setting industry standards for corporate social responsibility.

In line with this philosophy, Smithfield Foods continued its longstanding sponsorship of and participation in World Water Monitoring Day for 2010. Company representatives from more than 50 facilities worldwide worked with nearly 750 volunteers from schools, youth organizations, and local government agencies to analyze local waterbodies and share information about water quality. More than 200 sampling kits were provided by Smithfield Foods in support of these efforts.

WWMD provides an excellent opportunity for Smithfield Foods' employees to help raise the understanding of water quality and the factors that influence it with a variety of stakeholders at a local level. For that reason, WWMD has become an integral part of the company's social responsibility efforts. Visit Smithfield Foods online at [www.smithfieldfoods.com](http://www.smithfieldfoods.com).



## 2010 Partners

A number of organizations and agencies partnered with World Water Monitoring Day coordinators and sponsors to promote and implement WWMD in 2010. These included:

### International/National Partners



#### Adecagua

The fourth World Water Monitoring Day (Día Mundial del Control de la Calidad del Agua) campaign in Spain was coordinated by Adecagua between March 22 and Dec. 31. During this fourth campaign, there was wide participation with more than 20,000 people from schools, environmental education centers, scout groups, associations, and others taking part.

Every participant received a WWMD test kit, as well as tools for testing two additional parameters — nitrates and water hardness. Participants also received materials to sample for benthic macroinvertebrates, riparian vegetation, and pressures affecting the waterbody.

Participation in WWMD is made possible through the collaboration of the Spanish Ministry of Environment's national volunteer program for rivers. During the last 4 years more than 30,000 volunteers have participated in WWMD in Spain. Adecagua looks forward to creating a new social consciousness about the problems affecting waterbodies through future WWMD endeavors.



#### American Academy of Water Resources Engineers

The American Academy of Water Resources Engineers (AAWRE) has been getting the word out about World Water Monitoring Day to its water resources engineers, their respective organizations, and to younger members of the American Society of Civil Engineers (ASCE). In 2011, the organization plans to continue coordinating presentations and talks from its water resources engineers to classrooms in the United States and internationally. By informing its members about WWMD, AAWRE hopes to use the program to connect with young people on the topic of water resources.

AAWRE is a nonprofit organization formed in 2004 by water resources engineers from the ASCE Environmental and Water Resources Institute (EWRI) to improve the practice, elevate the standards, and advance the profession of water resources engineering by certifying engineers with specialized knowledge in water resources, recognizing the ethical practice of water resources engineering at the expert level, encouraging continued professional development for engineers, and supporting positions on water resources issues important to the public health.

## On Location

### Olekminsk, Russia

Submitted by Olga Yevstifeyeva  
Center for Creative Development and Liberal Education

On the left bank of the Lena River, which flows across the vast territory of the Sakha Republic into the Arctic Ocean, there stands the small town of Olekminsk. The townspeople are proud of the famous river as it is the fourth longest river in Russia and the 10th longest river in the world. It provides fresh water to the region throughout the year.

In 2008, construction of a huge oil pipe across the Olekminsk region began. School communities worried that the oil pipe would negatively impact the river. Despite the severe climate of the region (temperatures can drop to  $-55^{\circ}\text{C}$ ), several groups began monitoring the river year-round. Initiated by a group of students from the Center for Creative Development and Liberal Education, monitoring activities are now in their third year and have been augmented by the efforts of additional school groups. Presently, the program encompasses 12 sites throughout the region and involves more than 120 students and 14 teachers.

While the region's water quality tests favorably, the students understand that people should always remember that environmental health depends on their activity and that it is everybody's duty to protect it!







## CH2M HILL

Global full-service engineering, procurement, construction, and operations firm CH2M HILL has supported World Water Monitoring Day since 2003 because the program focuses public attention on water, encourages environmental stewardship, and allows employees to share their expertise with students, partners, and elected officials to raise awareness of water issues. The program also provides opportunities to strengthen relationships with clients and elected officials by teaming on events including water quality sampling and monitoring, classroom presentations, and participation in local water festivals. In 2010, nearly 20 CH2M HILL offices in China, Poland, Australia, and throughout the United States organized WWMD events in their communities.

Participants learned about water quality by testing pH, turbidity, dissolved oxygen, and temperature. Monitoring events also provided opportunities to engage participants in discussions about the impacts of their actions on water quality and means for becoming better environmental stewards.



## Emanti Management

Emanti Management, a water and environmental engineering company based in South Africa, proactively assists both the public and private sectors in finding effective solutions to the water and environmental management responsibilities and challenges they face on a daily basis.

Emanti became an active World Water Monitoring Day partner during 2010, distributing WWMD kits to more than 377 scholars! This was made possible by joining forces with Stellenbosch Local Municipality in the Western Cape Province. Emanti and Stellenbosch Municipality kicked off their WWMD program on Monday, Sept. 13 at Cloetesville High School. In the weeks that followed, groups from Stellenbosch High School, Kayamandi High School, Bloemhof High School, Bridgehouse High School, Simondium High School, and Somerset College all participated in the program.

Besides getting a valuable hands-on experience in science, more than 1000 students learned the importance of protecting our water resources and that stewardship of the environment is everyone's responsibility. Emanti

Management will continue its WWMD efforts in Southern Africa in 2011, educating more students and communities about the vital part they can play in the protection of our water resources.



## Girl Scouts of the USA

Approximately 1,300 Girl Scouts from 22 states and Puerto Rico participated in World Water Monitoring Day 2010. Through their participation in WWMD, girls achieved leadership skills all while developing their scientific monitoring skills. Girls were challenged to think critically about their own values and how water impacts them and how their actions impact local water sources. Girls connected with others locally and globally by teaming up on a worldwide effort. Girls took action to educate and inspire others through local efforts as well as via the worldwide database.



## Jewish National Fund

Jewish National Fund (JNF) has been a proud participant in World Water Monitoring Day for the past 8 years



with generous support from the U.S. Forest Service. In addition to spreading the message of WWMD in 2010, JNF utilized this important program to highlight the severe water crisis facing Israel and the Middle East. Thousands of students from 300 participating schools in the United States and Israel participated in JNF's Let It Rain program, testing their local water sources as part of WWMD and using JNF educational materials to learn about water conservation. Students were taught that the actions they take locally to conserve and keep water sources clean will have an impact on the entire global environment. Schools in the United States also took action to help their peers by raising funds to build rainwater harvesting systems and water conservation education, which is currently being implemented in schools throughout Israel. Visit JNF online at [www.jnf.org](http://www.jnf.org).



### LaMotte Company

A leading manufacturer of portable test equipment for lab and field, LaMotte Company specializes in hand-held colorimeters, turbidity meters, liquid and tablet reagent systems, test strips, and field test kits. Applications include water/wastewater, food/beverage processing, boiler/cooling tower water, swimming pool/spa

water, environmental applications, and environmental education.

LaMotte has manufactured and distributed over 80,000 test kits since the World Water Monitoring Day program's inception in 2001. LaMotte Company was founded in 1919 and is located in Chestertown, Md., on Maryland's Eastern Shore.



### National Public Lands Day

National Public Lands Day (NPLD), a program of the National Environmental Education Foundation, is the nation's largest hands-on volunteer effort to improve and enhance the public lands Americans enjoy. Today, eight federal agencies and many state and local lands participate in this annual day of caring for shared lands.

During NPLD 2010, 170,000 volunteers at over 2000 sites in all 50 states, the District of Columbia, and other U.S. territories, refurbished trails, removed invasive species, planted trees, and restored aquatic ecosystems. World Water Monitoring Day donated over 100 water kits to NPLD sites. Sites that used the kits were sponsored by federal agencies such as the U.S. Forest Service and U.S. Navy, as well as urban school districts and town

parks. This year's event also encouraged volunteers to explore and enjoy America's natural wonders through outdoor recreation. After working hard, volunteers took a hike, a swim, and got healthy in America's backyard.



### Outpost Central

Outpost Central is supporting World Wide Monitoring Day by providing Web visualization software and Web development services for the presentation of water data collected by the program's participants. Outpost Central develops smart water meter and sensor technology to seamlessly connect water meters and sensors to the Web and is one of the fastest growing technology companies in the Asia Pacific region. Outpost smart water meters are deployed by water utilities, schools, and large users of water to reduce leakage and manage water consumption.



### Water New Zealand

Water New Zealand is pleased to continue its partnership with World



Water Monitoring Day. Water New Zealand (formerly the New Zealand Water and Wastes Association – NZWWA) is a membership organization focused on promoting and enabling the sustainable management and development of the water environment. The goals of WWMD are closely aligned with the BOC Where There's Water Community Environmental Grants program, which is administered by Water New Zealand and funded by BOC. The aims of this grants program include helping communities to understand, maintain, protect, and improve their water environment.

Through the network that the grants program provides, Water New Zealand and BOC have encouraged students, community groups, and individuals to take part in water monitoring activities. WWMD has been promoted in the quarterly Where There's Water newsletter, and WWMD brochures have been distributed to current and past grant recipients. Water New Zealand considers WWMD to be a great initiative and is pleased to be able to help raise its profile in New Zealand.

## Regional/Local Partners

### Catamount Institute

Catamount Institute serves thousands of students, teachers,

and businesses in Colorado's Pikes Peak region with a vibrant range of innovative programs. Its mission is to inspire ecological stewardship, which it fulfills through youth and adult/business education and outreach.

It is celebrating its second year as a World Water Monitoring Day partner. In spring 2009, it received WWMD water test kits and immediately incorporated them into its custom field trip curriculum. This year its after-school club students studied water all semester, including water chemistry, macroinvertebrates, and fly fishing.

The WWMD kits have also been adopted into the Creek Watch program, a during-the-school-day, year-long water education program. Fourth graders at Eagleside Elementary in Fountain, Colo., have put their kits to work to study their creek. These students will report their findings at the Student Research Symposium, co-hosted by Colorado College, in April.

### Central States Water Environment Association

This year the Central States Water Environment Association (CSWEA) hosted a World Water Monitoring Day station at the Children's Water Festival, which was held in the Minneapolis and St. Paul metropolitan area. Students learned

about and performed water quality monitoring tests on different water sources. Monitoring kits were also distributed to teachers attending the festival along with encouragement to use the kits and report their data to the WWMD database.

Additionally, test kits were distributed to the following organizations: Barton Open School, Eagle Bluff Environmental Learning Center, Girl Scouts/Daisies Troop 14207, Lake Nokomis Community School – Keewaydin Campus, Southwest Minnesota State University, and Armour-Erkrich Meats, LLC.

As of Dec. 13, 16 waterbodies in Minnesota had been monitored. Data were reported for the following: Bush Lake, Canisteo Pit, Crystal Lake, Eagle Bluff's Big Pond, Grass Lake, Lake Harriet, Lake Nokomis, McCarron's Lake, Midway River, Minnehaha Creek, Mississippi River, Otter Tail River, Redwood River, Root River, Saint James Lake, and Trout Lake.

### Florida Water Environment Association

The Florida Water Environment Association enjoyed enhanced funding of its World Water Monitoring Day program this year through association and member contributions and continued to reach out





to teachers, families, and others in the state. Public Communications and Outreach Committee members distributed nearly 200 water quality test kits at several venues, including Palm Beach County's Green Schools Day (42 kits to teachers and families) and Florida Association of Science Teachers' (FAST) Annual Conference (more than 80 kits to teachers). One teacher from the FAST conference has secured approval for a school-wide WWMD project in the spring of 2011. WWMD was also featured as an activity at the Engineering Family Fun Day held in West Palm Beach.

## Great Swamp Watershed Association

2010 marked the Great Swamp Watershed Association's (GSWA) fourth consecutive year as a participant in World Water Monitoring Day and its second year as an official partner in the international program. In order to best manage its participation, the association solicits volunteer monitors to test the watershed's streams and/or lakes during the period from Sept. 18 through Oct. 18. Volunteers are provided with a WWMD test kit and a map indicating the watershed's boundaries. They are instructed to test a site (or several sites) of their choosing and report their data to the WWMD Web site.

This year, five volunteers participated in the program and tested the water at a total of 13 sites. As of Nov. 1, these data represented almost 50% of the data collected throughout the entire state of New Jersey. With even better advertising and promoting of the program, GSWA hopes to grow this number in 2011. WWMD is a valuable program that truly builds public awareness and involvement in protecting water resources — a big part of GSWA's mission!

## Montana Watercourse

In 2010, Montana Watercourse celebrated its 21st year of statewide water monitoring efforts. As before, World Water Monitoring Day kits reached K–12 students and educators in the public, private, home, and Native American school systems. Together, these efforts reached more than 270 students and educators along 13 distinct waterbodies. Montana Watercourse continues its dedication to monitoring excellence by providing each monitoring team with test kit materials, sampling tutorials, hands-on activities, data uploading guidance, macroinvertebrate sampling support, and advanced water monitoring training. The Montana Watercourse looks forward to 2011 when staff will develop a water monitoring curriculum aligned with state education

standards and continue to bring water monitoring to classrooms across the state.

## Multidisciplinary Education for the Environment

Based in Park Forest, Ill., Multidisciplinary Education for the Environment (ME4E) is an environmental education consultancy group. Various organizations including schools, libraries, youth groups, and park districts utilize ME4E services, which are customized to meet their needs.

With the 2010 summer reading theme of "Splash Into a Good Book," local libraries were jumping at the chance to get a little wet. ME4E brought library patrons to local natural areas to perform water monitoring for World Water Monitoring Day and videotaped their experiences. Results were posted on Web sites, in social networks, blogged, and presented back at the libraries.

## New England Water Environment Association

The Public Education Committee of the New England Water Environment Association (NEWEA) hosted a coordinated World Water Monitoring Day effort with support from volunteers and CH2M HILL in 2010. On Sept. 10, a kickoff event was held to bring new adult volunteers up to speed on the program and to allow veterans to



share their stories and planning tips from past WWMD events.

NEWEA offered a couple of options to area schools and youth groups wishing to engage in the program. A total of 50 water quality test kits were donated to organizations that wished to conduct the tests on their own. For groups that desired the assistance, NEWEA and CH2M HILL arranged for volunteers. The volunteers brought all of the necessary supplies, led the participants through the activity, and ensured that data were collected and reported. Volunteers worked with more than 25 schools to host WWMD sampling events.

NEWEA is looking forward to continuing WWMD events in the spring of 2011.

### **Pacific Northwest Clean Water Association**

The Pacific Northwest Clean Water Association (PNCWA) has taken an active role in nurturing future water professionals and sharing its knowledge and expertise around the world. In 2010, PNCWA promoted World Water Monitoring Day via several of its outreach initiatives. One such initiative was the Adopt-a-School grant program in which \$4700 was distributed to 10 schools to enhance water-related curriculum.

During the past few years, the

PNCWA Public Education Committee has built a solid relationship with the National Science Teacher Association affiliates and participated at their state conferences. At these conferences, WWMD and the Stockholm Junior Water Prize were prominently featured.

The PNCWA Public Education Committee continues to purchase and distribute kits to Oregon, Washington, and Idaho schools and community groups.

### **Rocky Mountain Water Environment Association**

The Rocky Mountain Water Environment Association (RMWEA), a member association of the Water Environment Federation, is proud to support World Water Monitoring Day in Colorado, Wyoming, and New Mexico. RMWEA supported hands-on use of WWMD kits at several events in 2010, including educational activities at the Littleton–Englewood wastewater treatment plant in Colorado. These events, which included a number of other agencies such as the U.S. Geological Survey, focused on water quality and utilized WWMD kits to get kids hands-on monitoring experience. The data collected were then compared with data collected by “higher-tech” instrumentation.

Additionally, RMWEA distributed more than 30 WWMD kits to teachers at the 2010 Colorado Science

Teacher’s Conference. Members of RMWEA spoke with teachers about possibilities for incorporating WWMD into their curricula and distributed information about WWMD. The contacts made at this conference should help expand WWMD in the Rocky Mountain West.

### **South East Queensland Healthy Waterways Partnership**

The South East Queensland Healthy Waterways Partnership is a whole-of-government, whole-of-community collaboration of over 113 organizations that focuses on understanding, planning, and managing the use of the waterways and catchments of South East Queensland, Australia.

Along with other science, capacity building, and communication and education programs, the Partnership Office delivers the Ecosystem Health Monitoring Program (EHMP), which is one of the most comprehensive marine, estuarine, and freshwater monitoring programs in Australia. The EHMP delivers a regional assessment of the ambient ecosystem health (or pulse) for each of South East Queensland’s (SEQ) 19 major catchments, 18 river estuaries, and Moreton Bay, highlighting where the health of the waterways is getting better or worse. The EHMP is managed by the SEQ Healthy



Waterways Partnership on behalf of its various partners and is implemented by a large team of experts from the Queensland Government, universities, and the Commonwealth Scientific and Industrial Research Organisation CSIRO.

## **Stony Brook–Millstone Watershed Association**

The Stony Brook–Millstone Watershed Association protects clean water and the environment in the Millstone River Watershed of central New Jersey. It also works with watershed groups statewide through its Watershed Institute program. Stony Brook's Watershed Institute, StreamWatch, and education programs participated in World Water Monitoring Day, providing outreach throughout the watershed and the state and conducting valuable water monitoring activities. The Watershed Institute mailed WWMD brochures to New Jersey's watershed groups. It also posted

WWMD information to its Web site and listserv, providing updates and encouraging groups to get involved and submit data.

The StreamWatch Program included articles on WWMD in its March and September issues of The StreamWatcher newsletter, ensuring that monitoring volunteers knew about WWMD. StreamWatch also submitted September 2010 data from three monitoring sites to WWMD.

Additionally, the Education Department worked with approximately 100 high school environmental science students to conduct chemical and biological stream assessments of the Stony Brook.

## **Virginia Water Monitoring Council**

The Virginia Water Monitoring Council (VWMC) supplied World Water Monitoring Day kits to the Virginia Department of Environmental

Quality, which donated them to teachers and other educators around the state. Thanks to VWMC and other contributors, 340 kits were provided. To complement the WWMD activity, VWMC developed an online resource with Virginia-specific water information for schools, communities, and informal educators to use. The web address for this new online tool is: [www.longwood.edu/cleanva/world\\_water\\_monitoring\\_va/homepage.html](http://www.longwood.edu/cleanva/world_water_monitoring_va/homepage.html). Members of the Council made presentations about integrating WWMD into the classroom at the annual meeting of the Virginia Association of Science Teachers, as well as a conference for environmental educators. An additional 60 educators received WWMD kits at these presentations.

VWMC has secured funding to continue to donate WWMD kits to Virginia teachers in 2011. These 2010 projects were made possible thanks to a grant from the Altria Group, Inc. to the VWMC.





# F10 Appendices



# Water Champion Regional Judging Panels

## Africa

### Andre Klokow

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Energy Central  
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SEQ Healthy Waterways Partnership  
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### Jenifer Simpson

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# Participation and Averages by Country

Country	Sites	Participants	Dissolved Oxygen (PPM)	pH	Temperature (°C)	Turbidity (JTU)
Albania	9	150	6.44	7.53	12.11	66.67
Argentina	16	883	6.82	7.62	13.37	16.08
Armenia	27	364	5.83	7.33	12.90	28.62
Aruba	1	29	4.00	8.00	30.34	40.00
Australia	58	916	5.99	7.16	19.73	20.06
Austria	2	14	4.00	7.25	15.50	0.00
Bangladesh	24	395	3.53	7.23	26.40	26.67
Belarus	3	24	5.33	7.33	7.00	13.33
Belgium	1	5	4.00	8.00	7.00	18.00
Bolivia	1	60	6.00	7.50	22.00	40.00
Brazil	3	86	7.00	6.75	23.25	20.00
Brunei Darussalam	1	32	0.00	7.00	30.00	0.00
Bulgaria	5	60	6.55	7.28	17.72	50.00
Cameroon	41	14,599	4.86	6.70	24.20	17.45
Canada	17	236	6.78	7.24	13.38	17.29
Chile	5	27	7.20	7.40	13.20	0.00
China	13	438	5.44	7.54	23.81	63.92
Colombia	6	477	6.67	7.58	19.17	30.00
Congo	2	35	6.00	6.50	28.00	20.00
Costa Rica	5	101	5.42	7.00	21.92	19.17
Croatia	2	12	4.00	6.77	11.67	41.33
Cuba	1	8	4.00	7.00	20.00	0.00
Czech Republic	26	307	4.07	6.67	8.37	16.33
Dominica	1	20	7.90	7.00	21.67	--
Ecuador	8	270	5.63	7.69	16.63	45.63
Estonia	1	8	0.00	7.00	1.50	0.00
Finland	3	30	2.00	7.50	3.00	0.33
Georgia	4	55	4.29	7.14	16.57	42.86
Germany	1	8	4.00	8.50	12.00	100.00
Ghana	13	345	1.93	7.70	30.04	45.85
Greece	2	4	4.00	7.25	16.00	30.00
Guatemala	1	2	4.00	7.00	18.00	0.00
Honduras	1	5	3.00	8.50	23.00	70.00
Hungary	1	21	0.00	7.71	10.00	40.00
India	254	7,032	3.15	7.78	22.35	30.65
Indonesia	29	1,638	4.60	7.49	28.49	62.13
Iran	3	11	4.00	8.00	4.67	0.00
Israel	5	137	6.92	7.86	23.91	40.00
Italy	9	53	5.20	7.00	9.20	18.00
Jamaica	2	348	6.78	7.27	23.73	10.42
Japan	1	8	4.00	8.00	21.00	40.00
Kazakhstan	2	21	4.10	6.70	17.00	30.00
Kenya	3	70	5.33	7.00	24.67	40.00



Country	Sites	Participants	Dissolved Oxygen (PPM)	pH	Temperature (°C)	Turbidity (JTU)
Lithuania	3	32	6.50	7.44	-0.13	32.50
Macedonia	5	73	5.60	7.00	12.60	44.00
Malaysia	290	86,242	1.34	7.28	28.07	9.55
Mali	6	16	2.67	6.67	27.33	26.67
Mexico	2	36	5.33	7.00	23.33	26.67
Morocco	10	36	4.93	8.21	20.98	68.55
Nepal	9	33	4.71	7.29	12.59	56.94
Netherlands	2	16	1.33	7.00	11.33	0.00
Niger	5	41	6.86	7.29	22.14	40.00
Norway	4	184	2.00	6.83	11.50	0.00
Pakistan	3	126	2.67	7.00	19.33	80.00
Papua New Guinea	1	29	4.00	7.50	30.00	40.00
Paraguay	2	12	6.00	7.00	26.00	70.00
Philippines	60	1,230	5.16	7.37	28.07	19.79
Poland	13	187	5.15	7.62	10.58	31.54
Portugal	4	34	4.00	7.69	7.62	36.92
Romania	301	18,147	4.44	7.33	13.36	16.25
Russian Federation	17	562	9.03	7.23	5.68	21.67
Saint Lucia	3	51	5.47	6.90	25.56	--
Sierra Leone	2	23	6.00	7.00	--	40.00
Singapore	137	710	4.87	7.82	29.13	35.57
Slovakia	3	42	8.00	7.00	5.33	0.00
Slovenia	7	65	5.14	7.50	19.57	18.57
South Africa	31	534	6.41	7.27	18.28	17.50
Spain	1,485	20,362	5.30	6.96	13.63	19.35
Sri Lanka	12	317	4.41	6.80	23.34	44.88
Sudan	5	125	6.60	7.40	28.00	88.00
Sweden	1	57	0.00	7.67	13.00	0.00
Taiwan	255	8,187	3.79	7.38	26.36	26.55
Tajikistan	10	40	6.40	7.30	7.00	4.00
Thailand	9	356	3.08	7.43	29.47	20.00
Timor-Leste	14	53	5.07	7.03	23.93	22.67
Togo	10	2,556	4.85	7.31	27.23	23.08



Country	Sites	Participants	Dissolved Oxygen (PPM)	pH	Temperature (°C)	Turbidity (JTU)
Turkey	2	144	6.00	7.00	14.00	0.00
Uganda	9	36	5.78	7.89	27.22	53.33
United Kingdom	13	36	9.02	7.84	16.42	20.00
United States	2,931	41,399	7.00	7.50	23.48	25.83
Uruguay	3	56	7.03	7.43	18.73	34.23
Vanuatu	1	20	4.00	7.50	12.00	0.00
Vietnam	3	171	6.67	8.33	29.00	43.33
Zambia	5	81	4.00	7.56	26.22	40.00
Zimbabwe	24	701	4.09	7.10	21.87	7.66
<b>TOTALS</b>	<b>6,325</b>	<b>212,502</b>	<b>4.84</b>	<b>7.34</b>	<b>18.50</b>	<b>29.11</b>

## Participation and Averages by U.S. State/Territory

State/Territory	Sites	Participants	Dissolved Oxygen (PPM)	pH	Temperature (°C)	Turbidity (JTU)
Alabama	5	9	6.71	6.96	15.87	10.92
Alaska	3	77	3.50	6.83	9.67	26.67
Arizona	21	199	4.90	7.48	18.59	37.18
Arkansas	1	28	4.00	7.00	12.00	20.00
California	131	2,935	6.41	7.79	16.23	12.01
Colorado	41	1,098	6.53	7.69	15.20	32.61
Connecticut	25	206	6.67	7.01	19.34	14.32
Delaware	11	399	7.25	7.22	17.51	22.53
Florida	55	1,092	4.28	7.33	23.19	18.91
Georgia	272	3,421	6.92	6.87	20.70	5.74
Hawaii	11	570	7.52	7.59	24.86	9.97
Idaho	9	110	5.67	7.89	11.00	16.83
Illinois	32	1,833	6.29	7.48	16.54	25.98
Indiana	49	764	6.47	7.19	17.41	22.52
Iowa	692	5,392	8.03	7.84	15.69	16.00
Kansas	39	503	3.71	7.56	19.98	56.62



State/Territory	Sites	Participants	Dissolved Oxygen (PPM)	pH	Temperature (°C)	Turbidity (JTU)
Kentucky	5	73	5.40	7.28	20.20	13.20
Louisiana	3	44	5.06	7.80	29.60	40.00
Maine	5	35	6.05	7.58	14.34	13.33
Maryland	31	530	5.35	7.11	23.68	18.00
Massachusetts	240	5,224	6.02	6.86	20.55	24.25
Michigan	57	433	7.06	7.35	14.47	7.63
Minnesota	8	365	5.72	7.77	10.62	24.74
Mississippi	2	59	1.33	6.17	22.00	0.00
Missouri	45	458	7.55	7.89	18.03	20.56
Montana	29	424	5.64	7.77	11.47	25.73
Nebraska	16	140	3.06	6.58	13.66	17.27
New Hampshire	17	44	7.25	7.23	15.83	0.43
New Jersey	54	895	4.87	6.97	14.56	21.17
New Mexico	2	5	--	8.07	12.67	--
New York	35	373	7.28	7.15	15.99	19.48
North Carolina	34	615	5.32	6.89	17.78	20.15
Ohio	13	151	7.26	7.26	14.72	34.36
Oklahoma	1	2	12.88	8.07	12.63	36.70
Oregon	5	30	7.80	7.10	11.44	44.10
Pennsylvania	48	2,167	9.42	7.62	12.38	7.84
Puerto Rico	38	599	6.82	7.53	28.56	36.33
South Carolina	25	187	4.61	6.39	22.81	7.25
South Dakota	44	349	6.59	7.53	18.78	36.00
Tennessee	31	1,035	4.04	7.46	22.50	15.80
Texas	166	3,620	6.66	7.65	22.82	25.78
Utah	8	318	2.98	7.94	16.14	40.89
Vermont	6	47	3.10	7.15	10.17	5.15
Virginia	483	2,539	7.93	7.48	19.13	9.01
Washington	26	169	4.21	7.77	11.88	22.69
Washington, D.C.	3	360	9.00	7.38	22.00	10.00
West Virginia	1	16	8.00	6.00	22.00	40.00
Wisconsin	17	479	7.22	6.95	14.64	27.46
Wyoming	6	424	6.06	7.44	11.73	20.00
Unidentified	30	554	5.63	7.13	20.04	23.51
<b>TOTALS</b>	<b>2,931</b>	<b>41,399</b>	<b>6.08</b>	<b>7.32</b>	<b>17.27</b>	<b>21.58</b>





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